

**HYBRID Q-SWITCH DEVICES, LASERS**  
**USING THE SAME, AND METHOD OF OPERATION**

**ABSTRACT**

A hybrid Q-switch device for a laser device having a laser medium being pumped with energy includes a solid-state saturable absorber element for controlling loss modulation of the laser medium; an active Q-switch element having open and closed states for controlling loss modulation of the laser medium and positioned in series with the laser medium and the absorber element; and, a device for adjusting timing of the open and closed states of the active Q-switch element. The combined loss modulation control from active Q-switch and absorber elements enable generation of a short width, high peak power pulse at a lasing wavelength. Particularly, the loss modulation effects of active and passive Q-switch means are timed to minimize cavity loss at which time a high peak power pulse of small pulse width is generated.